	Background Statistics for Data Sets with Non-Detects	
User Selected Options		
Date/Time of Computation	8/2/2013 12:21:41 PM	
From File	WorkSheet.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Coverage	95%	
rent or Future K Observations	1	
mber of Bootstrap Operations	2000	

Aroclor

General Statistics

Total Number of Observations	38	Number of Missing Observations	0
Number of Distinct Observations	32		
Number of Detects	15	Number of Non-Detects	23
Number of Distinct Detects	14	Number of Distinct Non-Detects	18
Minimum Detect	4.95	Minimum Non-Detect	1.3
Maximum Detect	10.93	Maximum Non-Detect	9.8
Variance Detected	2.841	Percent Non-Detects	60.53%
Mean Detected	7.267	SD Detected	1.686
Mean of Detected Logged Data	1.96	SD of Detected Logged Data	0.223

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.132	d2max (for USL)	2.846

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

Mean	3.771	SD	3.105
95% UTL95% Coverage	10.39	95% KM UPL (t)	9.078
90% KM Percentile (z)	7.75	95% KM Percentile (z)	8.879
99% KM Percentile (z)	10.99	95% KM USL	12.61

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	3.739	SD	3.193
95% UTL95% Coverage	10.55	95% UPL (t)	9.196
90% Percentile (z)	7.831	95% Percentile (z)	8.991
99% Percentile (z)	11.17	95% USL	12.83

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.322	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.735	etected data appear Gamma Distributed at 5% Significance Lev
K-S Test Statistic	0.158	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.221	etected data appear Gamma Distributed at 5% Significance Lev

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	21.24	k star (bias corrected MLE)	17.03
Theta hat (MLE)	0.342	Theta star (bias corrected MLE)	0.427
nu hat (MLE)	637.1	nu star (bias corrected)	511
MLE Mean (bias corrected)	7.267		
MLE Sd (bias corrected)	1.761	95% Percentile of Chisquare (2k)	48.68

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

	A	B	C	D	E	F	G	H	I	J	K	L
63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66					Minimum	1.992				Mean		4.849
67					Maximum	10.93				Median		4.007
68					SD	2.286				CV		0.471
69					k hat (MLE)	5.205				k star (bias corrected MLE)		4.812
70					Theta hat (MLE)	0.931				Theta star (bias corrected MLE)		1.008
71					nu hat (MLE)	395.6				nu star (bias corrected)		365.7
72					MLE Mean (bias corrected)	4.849				MLE Sd (bias corrected)		2.21
73					95% Percentile of Chisquare (2k)	17.79				90% Percentile		7.809
74					95% Percentile	8.962				99% Percentile		11.4
75	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
76	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
77					WH	HW					WH	HW
78				Approx. Gamma UTL with 95% Coverage	10.51	10.67				95% Approx. Gamma UPL	9.053	9.12
79				95% Gamma USL	13.3	13.73						
80												
81	**The following statistics are computed using gamma distribution and KM estimates**											
82	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
83					k hat (KM)	1.474				nu hat (KM)		112
84					WH	HW					WH	HW
85				Approx. Gamma UTL with 95% Coverage	12.71	13.28				95% Approx. Gamma UPL	10.02	10.24
86				95% Gamma USL	18.27	19.9						
87												
88	**Lognormal GOF Test on Detected Observations Only**											
89					Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**					
90					5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level					
91					Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**					
92					5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level					
93	**Detected Data appear Lognormal at 5% Significance Level**											
94												
95	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
96					Mean in Original Scale	5.263				Mean in Log Scale		1.603
97					SD in Original Scale	1.966				SD in Log Scale		0.332
98					95% UTL95% Coverage	10.09				95% BCA UTL95% Coverage		10.93
99					95% Bootstrap (%) UTL95% Coverage	10.93				95% UPL (t)		8.767
100					90% Percentile (z)	7.606				95% Percentile (z)		8.582
101					99% Percentile (z)	10.76				95% USL		12.79
102												
103	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
104					KM Mean of Logged Data	0.967				95% KM UTL (Lognormal)95% Coverage		15.97
105					KM SD of Logged Data	0.846				95% KM UPL (Lognormal)		11.17
106					95% KM Percentile Lognormal (z)	10.58				95% KM USL (Lognormal)		29.23
107												
108	**Background DL/2 Statistics Assuming Lognormal Distribution**											
109					Mean in Original Scale	3.739				Mean in Log Scale		0.881
110					SD in Original Scale	3.193				SD in Log Scale		0.992
111					95% UTL95% Coverage	20				95% UPL (t)		13.15
112					90% Percentile (z)	8.603				95% Percentile (z)		12.33
113					99% Percentile (z)	24.25				95% USL		40.61
114	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
115												
116	**Nonparametric Distribution Free Background Statistics**											
117	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
118												
119	**Nonparametric Uppper Limits for BTVs(no distinction made between detects and nondetects)**											
120					Order of Statistic, r	38				95% UTL with95% Coverage		10.93
121					Approximate f	2				Confidence Coefficient (CC) achieved by UTL		0.858
122					95% UPL	10.09				95% USL		10.93
123					95% KM Chebyshev UPL	17.48						
124												

	A	B	C	D	E	F	G	H	I	J	K	L
125	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
126	data set free of outliers and consists of observations collected from clean unimpacted locations.											
127	The use of USL tends to provide a balance between false positives and false negatives provided the data											
128	represents a background data set and when many onsite observations need to be compared with the BTV.											
129												